Tanta University
Faculty of engineering
Electrical Power and Machines engineering department
Principles of Energy Conversion Course

Sheet (1) …… D.C. Generators

1) A 4 pole, lap wound, D.C. generator has 42 coils with 8 turns per coils. It is driven at 1120 r.p.m. If useful flux per pole is 21 mWb, calculate the generated e.m.f. Find the speed at which it is to be driven to generate the same e.m.f. as calculated above, with wave wound armature.

2) A 250 V, 10kW, separately excited generator has an induced e.m.f. of 255 V at full-load. If the brush drop is 2 V per brush, calculate the armature resistance of the generator.

3) A short shunt compound D.C. generator supplies a current of 75 A at a voltage of 225 V. Calculate the generated voltage if the resistance of armature, shunt field and series windings are 0.04 Ω, 90 Ω and 0.02 Ω respectively.

4) A 4 pole, lap wound long shunt compound generator has 1200 armature conductor. The armature, series field and shunt field resistances are 0.1 Ω, 0.15 Ω and 250 Ω respectively. If the flux per pole is 0.075 Wb. Calculate the speed at which the machine should be driven so that it can deliver the load of 50 kW at 500 V. Take overall voltage drop due to brush contact as 2 V.

5) A wave wound, 6 poles, long shunt compound D.C. generator has 600 armature conductors. The generator is driven at 300 r.p.m. Calculate the e.m.f. generated if the flux/pole is 0.06 Wb. If now, the generator is required to produce e.m.f. of 550 V at a reduced value of flux/pole of 0.055 Wb, calculate the speed at which the armature of the generator must be driven.

Best wishes
Course committee:
Dr. Abd Al-Wahab Hasan
Eng.Ahmed Omara
Eng. Kotb Mohamed